



UNIVERSITI PUTRA MALAYSIA

**MODELLING OF COMPLIANCE BEHAVIOUR OF
MOTORCYCLISTS TO PROPER USAGE OF SAFETY
HELMETS IN MALAYSIA**

KULANTHAYAN K.C. MANI @ SUBRAMANIAN

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By

KULANTHAYAN K.C. MANI @ SUBRAMANIAN

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia,
in Fulfilment of the Requirements for the Degree of
Doctor of Philosophy**

August 2002



DEDICATION

Especially to my beloved parents . . .

Father (S. KL. Mani (@ Subramanian))

Mother (Mani Meenakshi)

Special to . . .

S. Seetha

S. Lakshmi

S. Ganesan

N. Nachiappan

A. Somasundaram

N. Avinash

N. Indra

S. Varshini

Last but not least to my other half . . .

my beloved wife Dr. R. Annapoornam

Thanks for the support, encouragement, guidance, advice, patience and faith.



Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

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August 2002

Chairman : Professor Ir. Dr. Radin Umar Radin Sohadi

Faculty : Engineering

The motorcycle is a common mode of transportation in Malaysia. About 60% of fatalities and casualties resulting from road crashes in Malaysia can be attributed to the motorcycle. Half of these motorcyclist fatalities are a result of head injuries. These statistics lead to the inevitable conclusion that the head is the most important part of the body that must be protected in any injury control strategy involving motorcyclists. Studies have shown that one of the best ways to prevent head injuries is through the use of safety helmets. However, safety helmets provide protection only if used properly. Unfortunately, this is not always the case in Malaysia.

Therefore, a study on the factors influencing the compliance behaviour of proper usage of safety helmets was carried out. To the researcher's knowledge no such research has been undertaken in Malaysia. Such a study should enable the building of a compliance behaviour model to predict the probability of riders using properly secured helmets.

Besides, the study looked in-depth on individual knowledge and attitude of motorcyclists toward the practice of proper use of the safety helmet. The understanding of knowledge, attitude and practice is important in developing appropriate strategies for helmet usage as a person's practice can be influenced either positively or negatively through knowledge and attitude.

A questionnaire study was carried out in Kajang, Malaysia on compliance behaviour of motorcyclists in relation to the proper usage of safety helmets for the period January to June 1998 from 8am to 6pm daily. A total of 500 respondents were interviewed in eight sampling stations selected to represent Kajang. A rider who tied his or her helmet properly was classified as complying with the safety helmet regulation, while a rider whose helmet was tied either loosely or was untied or did not wear a helmet at all was classified as not complying with the regulation. The data were analysed using bivariate and multivariate tools. Logistic regression method was used to develop the compliance behaviour model.

Results from bivariate analysis showed twelve variables to be significant ($p < 0.05$) by associated with proper usage of safety helmet in Malaysia. They were age, gender, education level, type of license, type of helmet, type of helmet fastening, riding location, riding distance, comfort of helmet, enforcement prediction, knowledge score level and attitude score level. Later, in the process of developing the compliance behaviour model, only five variables were found to be significant by associated with compliance. They were age, riding location, riding distance, attitude score level and type of helmet fastening. Compliance to the proper usage of safety helmet was found to be higher for

motorcyclists 21 years of age and above, travelling in town areas, using a helmet with a velcro type of fastening, travelling a distance of above 2 km and those with positive attitude on proper usage of safety helmet.

Therefore, road safety programs should be focused on short distance riders, riders with negative attitude on proper usage of safety helmet, young motorcyclists with poor road safety practice particularly those who ride in outside-town areas. It is recommended that future engineering and non-engineering road safety programs in promoting the proper usage of safety helmets should be more focused on increasing road safety knowledge of motorcyclists on the importance of understanding the safety helmet law. Also, there is a need to inculcate a positive attitude and good practice with respect to road safety. Besides, there should be an engineering contribution in terms of designing a new full shell safety helmet with a more convenient type of fastening to increase proper usage of the helmet. In addition, road safety programs should initiate research on making safety helmets more comfortable for the motorcyclists as an inducement towards proper usage.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

**MODEL AMALAN PEMATUHAN PENGGUNAAN TOPI KELEDAR
KESELAMATAN DIKALANGAN PENUNGGANG MOTOSIKAL DI
MALAYSIA**

Oleh

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Motosikal ialah salah satu jenis pengangkutan yang selalu digunakan dan mewakili lebih kurang 60% dari kematian dalam kemalangan jalan raya di Malaysia. Dari jumlah ini, lebih dari separuh adalah disebabkan kecederaan di kepala. Justeru itu, kepala merupakan anggota badan yang paling penting yang perlu di jaga dalam mana-mana strategi pengawalan kecederaan di kalangan penunggang motosikal. Kajian telah menunjukkan salah satu cara yang paling berkesan untuk mengelakkan kecederaan di kepala ialah dengan menggunakan topi keledar keselamatan. Walau bagaimanapun, inisiatif tersebut hanya berkesan jika penunggang menggunakan topi keledar dengan mengikat kemas dan rapi. Malangnya, di Malaysia, keadaannya tidaklah sedemikian.

Oleh itu, satu kajian untuk menilai faktor-faktor yang mempengaruhi pematuhan pemakaian topi keledar dengan betul amat diperlukan memandangkan sehingga hari ini,

tiada kajian yang sedemikian dilakukan di Malaysia. Ini membolehkan satu model pematuhan dibentuk supaya kebarangkalian penggunaan topi keledar keselamatan motosikal dapat di ramal. Selain itu, kajian ini juga telah mengkaji dengan mendalam pengetahuan dan sikap penunggang motosikal dalam mematuhi amalan penggunaan topi keledar dengan betul. Kefahaman pengetahuan, sikap dan amalan adalah penting dalam membentuk strategi yang betul dalam penggunaan topi keledar oleh seseorang individu. Ini kerana amalan mereka mampu di pengaruhi secara positif atau negatif melalui pengetahuan dan sikap.

Satu kajian soal selidik terhadap penggunaan topi keledar dengan betul telah dijalankan di Kajang, Malaysia dari bulan Januari hingga Jun 1998 dari jam 8 pagi hingga 6 petang. Sejumlah 500 responden telah ditemuduga di lapan stesen persampelan mewakili Kajang. Penunggang motosikal yang mengikat tali topi keledar dengan kemas dan rapi sahaja dianggap sebagai mematuhi peraturan penggunaan topi keledar yang betul. Bagi penunggang motosikal yang mengikat longgar, tidak mengikat atau tidak memakai langsung topi keledar keselamatan dianggap sebagai tidak mematuhi peraturan penggunaan topi keledar. Bagi menganalisis data yang dikumpul, kaedah analisis *bivariate* dan *multivariate* telah digunakan. Kaedah regresi logistik pula digunakan untuk membentuk model amalan pematuhan.

Keputusan dari analisis *bivariate* menunjukkan sebanyak duabelas pembolehubah bererti ($p < 0.05$) dalam mempengaruhi penggunaan topi keledar dengan sempurna. Pembolehubah tersebut adalah umur, jantina, tahap pendidikan, jenis lesen, jenis topi keledar, jenis pengikat topi keledar, lokasi menunggang, jarak perjalanan, keselesaan

topi keledar, jangkaan penguatkuasaan, tahap pengetahuan dan tahap sikap. Walau bagaimanapun, hanya lima (5) pemboleh ubah yang bererti dalam analisa *multivariate*. Pemboleh ubah tersebut adalah umur, lokasi menunggang, jarak perjalanan, tahap sikap dan jenis pengikat topi keledar. Justeru itu didapati penggunaan topi keledar yang betul adalah tinggi di kalangan penunggang motosikal berumur 21 tahun dan ke atas, penggunaan di kawasan bandar, penggunaan jenis pengikat velcro, jarak perjalanan 2 km dan lebih serta di kalangan penunggang yang bersikap positif terhadap penggunaan topi keledar yang betul.

Justeru itu, program keselamatan jalan raya harus ditumpukan ke atas penunggang perjalanan dekat, penunggang yang bersikap negatif terhadap penggunaan topi keledar yang betul, golongan muda yang mempunyai amalan yang lemah dalam keselamatan jalan raya khususnya semasa menunggang motosikal di kawasan luar bandar. Maka dicadangkan program mempromosikan penggunaan topi keledar yang betul harus memberi tumpuan ke arah meningkatkan tahap pengetahuan di kalangan penunggang motosikal. Keutamaan perlu diberikan kepada kefahaman peraturan penggunaan topi keledar yang betul dan keperluan untuk menanam sikap positif dan amalan baik berkaitan dengan keselamatan jalan raya. Di samping itu, harus ada pendekatan kejuruteraan dalam aspek rekabentuk topi keledar baru yang mempunyai ciri-ciri keselesaan pada pengikatnya bagi meningkatkan pemakaian topi keledar yang betul. Penyelidikan dan rekabentuk topi keledar keselamatan yang lebih selesa harus dijalankan untuk meningkatkan keselesaan pengguna dan sekaligus menggalakkan penggunaan topi keledar dengan sempurna.

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I submit in humility and gratitude to the supreme power – god, for having looked after me during these five hard years and protected me from major catastrophes in this life.

I certify that an Examination Committee met on 7th August 2002 to conduct the final examination of Kulanthayan K.C. Mani @ Subramanian on his Doctor of Philosophy thesis entitled “Modelling of Compliance Behaviour of Motorcyclists to Proper Usage of Safety Helmets in Malaysia” in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The Committee recommends that the candidate be awarded the relevant degree. Members of the Examination Committee are as follows:

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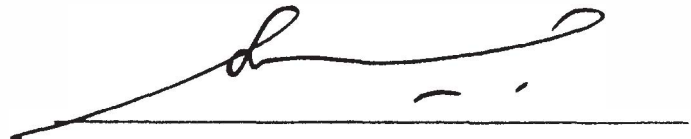
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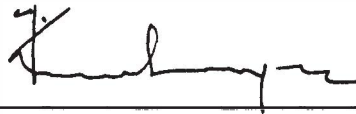
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DECLARATION

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UPM or other institutions.



KULANTHAYAN A/L K. C. MANI @ SUBRAMANIAN

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